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Author: Petra Potměšilová, Miloň Potměšil

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Petra Potměšilová[1], Miloň Potměšil[2]

Children's Behaviour Questionnaire Very Short Form (CBQ VSF) and its adaptation to the population of the Czech Republic

Kwestionariusz Zachowań Dziecka – Wersja Bardzo Krótka (CBQ VSF) i jego czeska adaptacja

[1] Department of Christian Education, Sts. Cyril and Methodius Faculty of Theology, Palacký University Olomouc, Olomouc, Czech Republic
[2] Institute of Special Pedagogy Studies, Faculty of Education, Palacký University Olomouc, Olomouc, Czech Republic
Correspondence: Doc. PhDr. & Mgr. Petra Potměšilová, PhD, Cyrilometodějská teologická fakulta UP, Univerzitní 22, 771 00 Olomouc, Czech Republic, tel.: +420 585 697 167 (111), +420 603 293 252, e-mail: petra.potmesilova@upol.cz

Abstract

This study provides information on the adaptation of the CBQ VSF (Children's Behavior Questionnaire Very Short Form) temperament description questionnaire. **Objectives:** The aim of the study was to adapt the CBQ VSF temperament questionnaire to the Czech child population for possible distribution to child psychologists for research purposes. **Materials and methods:** The data were obtained from a representative sample of parents of 840 children, 442 boys (53%) and 398 girls (47%), between the ages of 3 and 7 years. **Results:** The tool was tested in terms of its factor structure and the internal consistency and attributes of each item, all with respect to the age and gender of children in the target group. Scales were created for boys and girls and stratified by age and gender. Upon the completion of the work, the CBQ VSF questionnaire was adapted for use in research activities targeting the Czech population. **Study limits:** The results are based on the parental evaluation, but this was entirely consistent with the process of creation of the original tool.

Keywords: temperament, CBQ VSF questionnaire, adaptation, Czech population

Streszczenie

W pracy przedstawiono proces adaptacji Kwestionariusza Zachowań Dziecka – Wersji Bardzo Krótkiej (Children's Behavior Questionnaire Very Short Form, CBQ VSF) służącego do opisu temperamentu. **Cele badania:** Celem badania była adaptacja kwestionariusza CBQ VSF dotyczącego temperamentu do czeskiej populacji dzieci, co pozwoliłoby na ewentualną dystrybucję narzędzia wśród psychologów dziecięcych w celach badawczych. **Materiał i metody:** Dane uzyskano od reprezentatywnej próby rodziców 840 dzieci, w tym 442 (53%) chłopców i 398 (47%) dziewcząt w wieku od 3 do 7 lat. **Wyniki:** Omawiane narzędzie zostało ocenione pod kątem struktury czynnikowej oraz spójności wewnętrznej i atrybutów każdej pozycji, w każdym przypadku z uwzględnieniem wieku i płci dzieci z grupy docelowej. Skale utworzono dla chłopców i dziewcząt i poddano je stratyfikacji pod kątem wieku i płci. Efektem końcowym badania było dostosowanie kwestionariusza CBQ VSF do wykorzystania w badaniach prowadzonych w populacji czeskiej. **Ograniczenia:** Choć uzyskane wyniki opierają się na ocenie przeprowadzonej przez rodziców, było to całkowicie zgodne z procesem tworzenia oryginalnego narzędzia.

Słowa kluczowe: temperament, kwestionariusz CBQ VSF, adaptacja, populacja Republiki Czeskiej

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INTRODUCTION

Temperament is defined as constitutionally based individual differences in reactivity and self-regulation, influenced over time by heredity and experience (Rothbart and Derryberry, 1981). For the needs of this project, temperament is characterised as physiologically based, relatively consistent in time, and modifiable by experience and socialization (Rothbart and Bates, 1998). Specific manifestations of temperament can already be observed in children in infancy. In conjunction with emotionality and temperament, there are observable manifestations of varying degrees of nervousness, anxiety, euphoria, or calmness. According to Rothbart, from a psychobiological perspective temperament is a reflection of individual specifics in terms of reactivity and self-regulation of an individual (Rothbart and Bates, 2006).

Temperament plays an important role in the development of child's personality and is considered a key factor in the development of social competences (Hartup and van Lieshout, 1995; Rothbart and Bates, 1998; Rudasill and Konold, 2008; Valiente et al., 2011). Temperament is also considered an important item which is involved in the formation of human relationships in the social environment from childhood, during which social relationships are founded and modelled. Additionally, the way of overcoming stress loads in a person's life is influenced by temperament (Lorber and Egeland, 2011; Rothbart and Bates, 1998). By self-regulation, we understand the processes by which an individual manages their reactivity to incoming stimuli, including attention, avoidance, and effortful control (Rimm-Kaufman et al., 2009; Rothbart, 1991; Susa et al., 2014).

In terms of developmental psychology, preschool and younger school age is a period which is characterised by expressions of temperament in the school environment, where utterly specific and, in the first year of school, completely new requirements are imposed on the child. The ability to self-regulate and control one's own reactions is the basis for creating positive relationships with both peers and teachers. The future functioning of the child in the school environment can be predicted by the evaluation of this ability (Gleason et al., 2005; Valiente et al., 2003). An important part of the temperament, i.e. self-regulation, is related to emotional control and planning, as well as the control of one's own behaviour (Rothbart et al., 2006).

The degree of efficiency of the ability to control one's own reactivity is considered an important part of self-control in the broader view (Rothbart, 2011).

The ability to control attention, which is also considered part of effortful control (Rothbart, 2011), is considered important for the school experience of the child, thus allowing the child to focus, move, and maintain attention during school work according to his or her current needs (Posner and Rothbart, 2000). This is then related to the executive functions that the child needs for successful work at school and, by controlling his or her reactivity, he or she has the opportunity to be accepted in the social environment made up of his other classmates.

Temperamental manifestations are not only very little influenced by education, but largely not subject to the control of the will – they are characterised by the spontaneity of manifestations. For example, Cloninger et al. (1993), who distinguished temperament and character as the basic components of personality, distinguished character from temperament as a conscious reflection of oneself and the associated intentional (will) behaviour. Temperament can be permanently and intentionally influenced only to a small extent, but it is possible to learn to treat the manifestations of temperament efficiently (Balcar, 1983).

Mary Rothbart and her team have so far created the CBQ (The Children's Behavior Questionnaire) as an instrument to describe the temperament of children aged three to seven years. The first reference to the CBQ is from Rothbart et al. (2001), and the CBQ Very Short Form (VSF) was subsequently derived by Putnam and Rothbart (2006). This questionnaire has undergone several revisions. As for its administration, this instrument has a number of versions, such as CBQ Standard, CBQ Short, and Very Short Forms (Putnam and Rothbart, 2006) and Short Teacher Report Form (Teglasi et al., 2015).

The standard CBQ – which can be treated as a base – is a questionnaire for children aged three to seven years and is focused on assessing their temperament. The CBQ is a validated 195-item parental report measure of temperament. There are also Short (94 items) and Very Short versions (36 items; three scales – Surgency/Extraversion, Negative Affectivity, and Effortful Control).

The CBQ VSF, the very short form of this measure, with 36 items and three broad factor scales, was created to provide a broad overview of temperament (Putnam and Rothbart, 2006). It was designed to measure the main dimensions of child temperament. By comparison, the standard form of CBQ consists of a larger number of items and thus gives the possibility of more detailed and broader measurement after the power of specified sub-measures. By comparison, the standard form of CBQ consists of a larger number of items and thus gives the possibility of more detailed and broader measurement using specified sub-measures.

The CBQ VSF was developed mainly to provide researchers with an efficient method for assessing the three pilot dimensions of temperament: Surgency/Extraversion, Negative Affectivity, and Effortful Control. Parents are asked to read questions about specific child behaviours and respond by identifying the frequency with which their children behave in this particular way on a scale of 1 (extremely untrue) to 7 (extremely true), with an eighth option (does not apply), when there was no opportunity to observe the child in such a situation.

This paper addresses the adaptation of one of the questionnaires, i.e. the Children's Behavior Questionnaire Very Short Form (CBQ VSF), completed by parents.

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AIMS OF THE STUDY

The present study aims to describe the process of adapting the very short form of the CBQ to the Czech population, thus making it available to authorised experts. The main objective was to answer the following questions: whether the adapted version is also valid for the Czech population; whether the same scales will apply in the adapted version; whether these scales will consist of the same items; whether there are differences in mean values between boys and girls and based on age. Other goals of the study, apart from the above-mentioned research goal, were to obtain a functional tool for possible distribution to child psychologists and to create a tool for working with the parents of children with health or developmental risks. We also received feedback from parents who filled in the questionnaire during the main research, stating that they welcomed the questionnaire items as kind of "instructions" on how to observe their child and for what and where to seek possibilities for activation and stimulation.

MATERIALS AND METHODS

The adaptation of the CBQ VSF questionnaire to the Czech population complied with the Standards for Educational and Psychological Testing (2014). In view of the authors' previous experience with the modification of temperament questionnaires [Infant Behavior Questionnaire-Revised, IBQR (Potměšil and Potměšilová, 2017); Early Childhood Behavior Questionnaire, ECBQ (Potměšilová and Potměšil, 2019)], the same procedure consisting of six successive steps was used. The first step involved obtaining the questionnaire authors' consent to its adaptation. Identical items and structures that corresponded to the original version of the tool were used to adapt the CBQ VSF questionnaire. This was followed by translation into Czech, performed by an independent translation agency. Next, it was sent to five psychologists who were fluent in English for their comments on the Czech version. They helped create a more intelligible and unambiguous text. In the second stage, the questionnaire was distributed to 15 volunteers for their opinions on the intelligibility and clarity of the individual items for potential modification. During this stage, no substantial comments were made. The third stage involved a back-translation into English, again by an independent translation agency, followed by an authorial review. The fourth stage was a long and significant discussion with the authors of the original questionnaire regarding the "cultural adaptation" of some items and whether this did not change the questionnaire itself. The discussion was about different concepts of some items in the Czech Republic and the US. The outcome led to a consensus on cultural adaptation while maintaining the consistency of the questionnaire. The fifth stage involved a pilot study. The questionnaire was sent to a group of volunteers, thus conducting a feasibility study. If no comments emerged, the sixth stage was approached, i.e. the actual data collection.

Selection of parent respondents

With regard to the research objective, which was the adaptation of the questionnaire to the Czech population, a stratified selection of respondents was used, which allowed random selection of a certain number of respondents in given subgroups, in this case in the given age categories. Parents from across the Czech Republic were addressed through social networks (parents from different parents' groups), and then the questionnaires were placed in paediatricians' waiting rooms. The completed 645 questionnaires were obtained using the Internet version and 195 questionnaires were completed in a pencil-and-paper format.

The main criteria for choosing a respondent were: being a parent/step-parent/foster carer; having a child aged between three and seven years; the child not being disabled. During the period from spring to autumn 2019, data was obtained from a sample of parents of 876 children. All questionnaires were completed by the parents on their own, without researcher's intervention. The collection was completed when the necessary number of children in each particular age group was reached. During the entire data collection process, we received only three negative responses – refusal to complete the questionnaire for the sake of not wanting to indicate the date of birth of the child. This was perceived by three cases of parents as sensitive. Demographic data – such as social status, education, or housing – was not assessed in this research. The data was collected via paper and electronic questionnaires and copied into Microsoft Excel spreadsheets. There were no differences between the results of electronic and pencil–paper questionnaires.

Age category		Boys	Girls	Total
1	3–5	150 (34%)	137 (34%)	287 (34%)
2	6	135 (31%)	131 (33%)	266 (32%)
3	7	157 (35%)	130 (33%)	287 (34%)
Total		**442 (53%)**	**398 (47%)**	**840 (100%)**

Tab. 1. Division of children in target groups by gender and age

Scale	All	Boys	3–5	6	7	Girls	3–5	6	7
Negativity (NEG)	**0.70**	**0.69**	0.72	0.68	0.69	**0.71**	0.71	0.74	0.70
Surgency (SUR)	**0.78**	**0.79**	0.72	0.70	0.69	**0.75**	0.71	0.74	0.70
Effortful Control (EFFC)	**0.72**	**0.69**	0.64	0.72	0.69	**0.71**	0.73	0.66	0.72

Tab. 2. Cronbach's alpha values

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Factor name	Items	Range of factor loading			Number of items (total number of items in a scale)
		1	2	3	
Negativity (NEG)	CBQ32 Anger			0.61	10 (12)
	CBQ23 Soothability			0.6	
	CBQ5 Discomfort			0.58	
	CBQ14 Soothability			0.56	
	CBQ2 Anger	0.31		0.55	
	CBQ29R Discomfort			0.52	
	CBQ8 Sadness			0.42	
	CBQ35 Sadness			0.41	
	CBQ11 Fear			0.4	
	CBQ26R Fear			0.31	
Surgency (SUR)	CBQ7 Impulsivity	0.75			11 (12)
	CBQ4 High-intensity Pleasure	0.68			
	CBQ28 High-intensity Pleasure	0.64			
	CBQ19R Impulsivity	0.57		0.34	
	CBQ13R Activity Level	0.55			
	CBQ25 Activity Level	0.53			
	CBQ31R Impulsivity	0.52			
	CBQ1 Activity Level	0.52			
	CBQ10 Shyness	0.45			
	CBQ16 High-intensity Pleasure	0.41			
	CBQ34R Shyness	0.38		0.3	
Effortful Control (EFFC)	CBQ12 Perceptual Sensitivity		0.61		12 (12)
	CBQ36 Perceptual Sensitivity		0.61		
	CBQ24 Perceptual Sensitivity		0.58		
	CBQ3 Attention Focusing		0.53		
	CBQ27 Attention Focusing		0.52		
	CBQ21 Low-intensity Pleasure		0.49		
	CBQ6 Inhibitory Control		0.47		
	CBQ15 Attention Focusing		0.46		
	CBQ30 Inhibitory Control		0.41		
	CBQ9 Low-intensity Pleasure		0.39		
	CBQ33 Low-intensity Pleasure		0.3		
	CBQ18 Inhibitory Control		0.34	0.43	

Tab. 3. Extracted factors and level of factor loading

Age and sex of children

The statistical processing included a total of 876 children. We excluded 36 questionnaires because they had been insufficiently completed. Thus, the final number of questionnaires used was N = 840 [442 boys (53%) and 398 girls (47%)]. As with the original questionnaire, three age categories (Tab. 1) were created.

These age data may be supplemented with additional statistics for the 3–5-year category. In the case of boys, mean = 4.43, σ = 0.63 and range = 2; in girls then mean = 4.46, σ = 0.61 and range = 2.

RESULTS

Subsequently, reliability was determined using the Cronbach's alpha.

In the study, Cronbach's alpha values >0.6 were considered acceptable and values >0.7 were considered as good (Taber, 2018). It followed that all the Cronbach's alpha values were at a good or acceptable level (Tab. 2).

The next step in the research was factor analysis. The first step in the factor analysis was to determine if the data was appropriate. The Kaiser–Meyer–Olkin (KMO) value was found – KMO = 0.79 (p < 0.01) and an "anti-image matrix" was created, in which the values of the Measures of Sampling Adequacy (MSA) ranged between 0.62 and 0.87. Communality values ranged from 0.5 to 0.84. This clearly shows that the data is suitable for factor analysis. For this reason, the factors were extracted. The factors that were extracted corresponded to the particular scales in the original questionnaire (Tab. 3).

The principal component analysis method was used to extract the factors and the number of factors was chosen

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	Boys				Girls			
Scale	**3–5**	**6**	**7**	**Total**	**3–5**	**6**	**7**	**Total**
Negativity (NEG)								
M	4.17	4.43	4.27	4.28	4.29	4.27	4.35	4.3
SD	0.95	0.87	0.9	0.91	0.92	0.94	0.9	0.92
Me	4.17	4.5	4.25	4.25	4.33	4.17	4.33	4.27
Surgency (SUR)								
M	4.38	4.31	4.17	4.28	4.24	4.15	4.13	4.17
SD	0.96	0.92	1.1	1	0.92	0.85	1.03	0.93
Me	4.44	4.25	4.22	4.33	4.25	4.18	4.08	4.17
Effortful control (EFFC)								
M	4.81	5.09	5.12	5	5.25	5.48	5.4	5.37
SD	0.76	0.86	0.83	0.82	0.82	0.65	0.78	0.76
Me	4.83	5.17	5.25	5	5.42	5.58	5.44	5.5

Tab. 4. Values of particular scales in boys and girls

on the basis of the Kaiser rule. For easier interpretability, the factors were rotated by the Varimax method.

In the context of the original results, average values were calculated for each scale and gender (Tab. 4).

The mean values achieved on each scale were then compared in terms of age categories (three categories) and gender (two categories) using two-way ANOVA. The negativity scale was the first to be analysed. There were no statistically significant differences in age-gender interaction – $F(2, 834) = 1.81$, $p = 0.17$, nor in terms of age – $F(2, 834) = 1.26$, $p = 0.28$ or gender – $F(1, 834) = 0.05$, $p = 0.83$. On the Surgency scale, there were no statistically significant differences in age-gender interaction – $F(2, 834) = 0.32$, $p = 0.73$, nor in terms of age – $F(2, 834) = 2.01$, $p = 0.14$ or gender – $F(1, 834) = 2.86$, $p = 0.09$.

On the Effortful Control scale there were no statistically significant differences in the interaction of age and gender – $F(2, 834) = 0.72$, $p = 0.49$, but statistically significant differences were demonstrated at the significance level 0.01 in terms of both age – $F(2, 834) = 8.84$, $p < 0.001$, and gender – $F(1, 834) = 45.33$, $p < 0.001$.

The graphical representation (Fig. 1) of age differences indicates that they are highest in the score of Effortful Control at the age of six, then seven, and the lowest in the last age category (3–5 years). To verify the statistical significance of the mentioned result, the Kruskal–Wallis test was first used, which showed statistically significant differences between age groups ($H(2, N = 843) = 17.98$, $p < 0.001$). In order to select a suitable Post Hoc Multiple Comparison procedure, it was first necessary to determine whether there were equal variances in each age category. The Test of Homogeneity of Variances showed that the variances of each age category are equal ($F(2, 840) = 0.43$, $p = 0.65$). Based on this result, a Bonferroni test was used that showed statistically significant differences between age categories 3–5 and 6 years ($M = -0.27$, $SD = 0.07$, $p = 0.001$) and 3–5 and 7 years ($M = -0.28$, $SD = 0.07$, $p = 0.002$). On the other hand, differences between categories 6 and 7 years cannot be accepted as statistically significant ($M = 0.03$, $SD = 0.077$, $p = 1$).

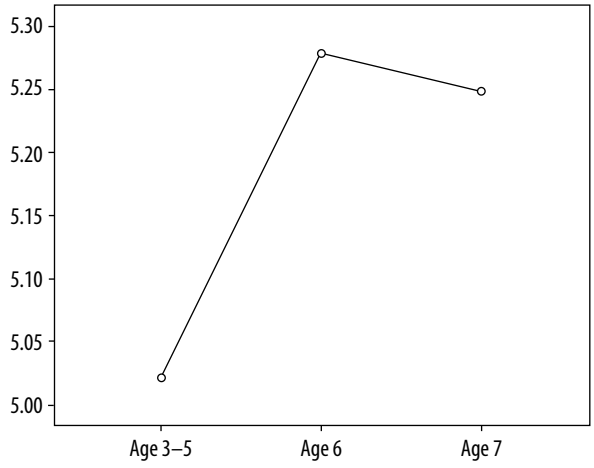

Fig. 1. Score of Effortful Control by age

DISCUSSION

The main objective of the research was to adapt the CBQ VSF questionnaire for the Czech population. The number of children in the basic sample ($N = 840$) is sufficient. The reliability of the questionnaire was verified using the Cronbach's alpha. All values ranged from acceptable to good values. The values of the alphas in the present work for Surgency, Negativity, and Effortful Control scales of 0.78, 0.70, and 0.72, respectively correspond to those cited by Putnam and Rothbart (2006).

Factor analysis showed that the individual items break down into three factors, which are identical to the original scales. Three items did not saturate any scale. These were items 17R (Seems to feel depressed when unable to accomplish some task), 20R (Hardly ever complains when ill with a cold) and 22R (Is sometimes shy even around people she/he has known a long time).

In more than 50% of respondents, for the item 17R was a choice – quite true of your child. For 22R, 50% of respondents voted extremely untrue and 20R extremely true. For other items, respondents used assessments across a scale of 1–7. In accordance with the original test, items cannot be deleted at this time. The authors are considering further data collection and discussion with parents.

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The Negativity and Surgency scales did not show statistically significant differences between the sexes, nor in terms of age. In the case of the Effortful Control scale, significant statistical differences were confirmed in terms of both, age and gender. The average values for Effortful Control are higher in girls than in boys. Interestingly, these values change with age in boys and, to some extent, in girls.

In terms of age, effortful control values were highest at the ages of 6 and 7 years. The lowest values were at the age of 3–5 years. However, on the basis of statistical verification, the difference between 6 and 7 years cannot be accepted as statistically significant. These results concur with the current findings of developmental psychology, as well as the results of research papers (Cosentino-Rocha and Linhares, 2013; Sánchez-Pérez et al., 2018; Tao et al., 2014; Yoleri, 2014), where girls show higher levels of social adjustment and are ahead of boys of the same age.

The CBQ VSF was translated into the Czech language and it was successfully standardised. The results regarding reliability and factor analysis indicate that the adapted questionnaire corresponds to the original version and can therefore be used in accordance with the authors' intention.

Teachers and other professionals will be able to use the Czech adaptation of the CBQ questionnaire as one of the tools that can help determine school readiness and subsequent school success. The questionnaire thus not only fulfils a kind of control function but can also be a source of inspiration for educators on how to work with children and what to improve. The final Czech version of the CBQ VSF questionnaire is available on the website of the original team of authors*.

LIMITATIONS AND FURTHER DIRECTIONS

Finally, some limitation of the study should be mentioned. Firstly, demographic data has not been collected to explain some of the results in the discussion. This should be included in the questionnaires for further use of the tool. Secondly, since data collection was anonymous, it was impossible to replicate and thus confirm the obtained results.

The authors of this study will continue their work. The next study will assess the external validity and stability of CBQ VSF with respect to the study population. For further research, an important topic is proposed – the child's temperament and its impact on the educational career of the child. It would be possible to find places for psychological and pedagogical intervention. The issue presented here requires a comprehensive view of the reflection of developmental tendencies in different age groups. The authors therefore focused their work on temperament and its description in different ages (Potměšil and Potměšilová, 2017; Potměšilová and Potměšil, 2019).

* More about: Bowdoin College Research: The Children's Behavior Questionnaire (CBQ) – https://research.bowdoin.edu/rothbart-temperament-questionnaires/instrument-descriptions/the-childrens-behavior-questionnaire/.

Conflict of interest

The authors do not report any financial or personal affiliations to persons or organisations that could adversely affect the content of or claim to have rights to this publication.

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